°FORM PTO-1390 (REV 11-2000) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371

ATTORNEY'S DOCKET NUMBER: 449122023800

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 10/069292 Not yet assigned

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/02827	August 18, 2000	August 24,1999

TITLE OF INVENTION

GENERIC ALIGNMENT METHOD IN A MULTIMANAGER ENVIRONMENT

APPLICANT(S) FOR DO/EO/US

Lucian HIRSCH

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: 1) Application Data Sheet; 2)Int'l Search Report; 3) IPER; 4) Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on February 25, 2002.

Melissa Garton

Melissa Garton

dc-304163

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY DOCKET NO
Not yet assigned 10/069292	PCT/DE00/02827	449122023800

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....$1,040.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....$890.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....$740.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4) $710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00

	CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$0	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		x $18.00	$0	
Independent claims	- 3 =		x $84.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $280.00	$0	
TOTAL OF ABOVE CALCULATIONS =				$890.00	
Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				$0	
SUBTOTAL =				$890.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$0	
TOTAL NATIONAL FEE =				$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 per property** +				$40.00	
TOTAL FEES ENCLOSED =				$930.00	
				Amount to be refunded:	**$**
				charged:	**$**

a. ☒ Please charge my **Deposit Account No. 03-1952** (referencing Docket No. 449122023800) in the amount of $930.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952** (referencing Docket No. 449122023800).

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Kevin R. Spivak
Registration No. 43,148

February 25, 2002

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on February 25, 2002.

Melissa Garton

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Lucian HIRSCH

Serial No.: Not yet assigned

Filing Date: February 25, 2002

For: GENERIC ALIGNMENT METHOD IN A MULTIMANAGER ENVIRONMENT

Examiner: Not yet assigned

Group Art Unit: Not yet assigned

PRELIMINARY AMENDMENT

BOX PCT
Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Specification:

Page 1, before the first paragraph, please delete the following:

Description

Page 1, between lines 4 and 5, please insert the following headings and paragraph:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/02827 which was published in the German language on August 18, 2000.

TECHNICAL FIELD OF THE INVENTION

Please replace the paragraph beginning line 5 of page 1 with the following rewritten paragraph:

The invention relates to a method and a communications system for data realignment, and in particular, by a management network which has at least two management levels.

Page 1, between lines 13 and 14, please insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 14 of page 1 with the following rewritten paragraphs:

The principles of a management network, which are also referred to as TMN principles (TMN: Telecommunications Management Network), define a number of management levels for the management of a communications system (e.g. of a mobile communications system) in which each level has two functions. In the managing system, each level except for the lowest level has a manager function for the level below it. In the managed system, each level apart from the uppermost level has an agent function for the next-higher level.

Fault management is, for example, an important part of TMN management. As a rule, the agent in this case plays the active role, by identifying fault events in good time and accurately to its own management level and by transmitting event reports (for example alarm reports) to the manager of the next-higher level. The transmission of event data from the agent to the manager is not critical, provided there is no disturbance to the communication mechanism between these systems. If the link between the two management levels, e.g. between agent and manager, is no longer ensured for a certain time, the agent must temporarily store the events which have occurred during this interval. This ensures that, once the communications capability has been restored, the manager is first provided as quickly as possible with an overview of the current network state, for example for active alarms in the form of a list. Secondly, the manager can build up a history of the events (event history) with as few gaps as possible, for example a history of both the active alarms and the cleared alarms.

To this end, data realignment is carried out between the agent and manager whenever a new connection is set up after a connection termination or after initialization of the agent or of the manager. All alarm data for active alarms for which faults in the agent have not yet been

rectified - identifiable from the fact that they are not identified as cleared alarms - must be made available to the next-higher management level completely and as quickly as possible.

Please replace the paragraph beginning line 11 of page 3 with the following rewritten paragraph:

Since the alarm data realignment process is controlled by the manager as a function of at least one parameter sent to the agent, the alarm data realignment for the manager can be configured with respect to the basic functionality. This means that it is no longer essential for the agent to send all the active alarms, but only those which are defined in more detail by the transmitted parameters. This provides the manager with a selection function for a subset from all the alarms. Standardized messages are used for this purpose.

Please replace the paragraph beginning line 31 of page 3 with the following rewritten paragraph:

In a multimanager environment, the agent must be able to cope with tasks from a number of managers, even at the same time. On the other hand, a manager can carry out its function optimally only when all the relevant events (event reports) are received as quickly as possible from the lower-level agents. In normal conditions, e.g. when the communication between an agent and a manager, or agents and managers, is functioning, this is done by using an event reporting mechanism. In this case, after identifying an event, the agent generates a corresponding message. In addition to the alarm messages, these are, for example, messages or notifications relating to a state change, object creation, object deletion or attribute value changes (attribute value change notification). These messages are sent to event forwarding discriminators, so-called EFDs, which may be located in the agent.

Please replace the paragraph beginning line 26 of page 4 with the following rewritten paragraph:

As described, there are various situations in which general data realignment is necessary, alarms, states, configuration changes between a manager or managers and an agent or agents, going beyond the normal event reporting mechanism, for example after a connection has been cleared or after initialization of the agent or manager. This alignment is generally started in response to a manager request.

Please replace the consecutive paragraphs beginning at line 7 of page 6 with the following rewritten paragraphs:

Until now, there have been two fundamental types of data realignment or alignment methods:

a) The manager sends a request (M-ACTION request in accordance with ITU-T Standard X.710) to the agent, containing the alignment parameters and a unique number. First, the agent sends a so-called start alignment notification - for the correlation of all the notifications sent using the alignment method with the manager request. Then the agent sends the alignment notification to all the EFD instances. The end of the alignment procedure is signaled to the manager by means of a CMISE-standardized M-ACTION response, or by means of a separate end alignment notification (CMISE: Common Management Information Service Element).

This method, which is already used in mobile radio systems, has disadvantages, since non-standardized notifications (start alignment/ end alignment) are introduced. Furthermore, in a multimanager environment, the notifications which are sent using a specific alignment process are also disadvantageously received by all the other managers. This results in unnecessary notifications and notifications received more than once. The above criteria 1 and 8 are thus not satisfied.

b) The manager sends a request, a CMISE-standardized M-ACTION request, which contains the alignment parameters, also including the filter criteria for this alignment procedure. In this case, the agent must first determine the notifications which correspond to those criteria. The agent then forms an M-ACTION response with all these notifications, and sends this to the request originator or manager.

This method likewise has disadvantages, since it means a specific implementation, because the agent must first check all the potential notifications in accordance with the filter criteria contained in the M-ACTION request. This leads to the alignment procedure lasting for a longer time. Furthermore, the alignment notifications do not use the same filters with regard to the event

report or event reporting (in the EFD) and with regard to the event logging (LOG) as the normal notifications. In consequence, the above criteria 1, 5 and 6 are not satisfied.

Page 7, between lines 18 and 19, please insert the following heading and paragraph:

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a system and method of data realignment by a management network having at least two management levels. Alarm data for active alarms is transmitted as, for example, generic alarm data realignment between an agent in one management level and a manager in a next-higher management level.

Please delete the paragraph beginning at line 19 of page 7 in its entirety.
Please delete the paragraph beginning at line 26 of page 7 in its entirety.

Please replace the consecutive paragraphs beginning at line 32 of page 7 with the following rewritten paragraphs:

In one aspect of the method, there is a generic method for carrying out an alignment procedure. This means, in particular, that it is independent of the transmitted information and manager/agent implementations.

No additional notifications that have not yet been defined in the Standards are required. This means simple implementation, compliant with the Standards, in the agent, and simple correlation in the manager between the request and alignment notifications.

Interposition of the filter units between the actual functional units of managers and agents reduces the load on them in favor of their routine tasks. There is no longer any need for autonomous filter functions for associating data realignment data with specific managers, in the managers and agents.

Page 8, between lines 23 and 24, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the paragraph beginning line 24 of page 8 with the following rewritten paragraph:

The invention will be explained in more detail in the following text using exemplary embodiments and with reference to the figures, in which:

Figure 1 shows a block diagram of a management network for a mobile communications system with an agent-manager relationship between an operation and maintenance center and one or more network management centers.

Figure 2 shows a block diagram of the management network as shown in Figure 1, with an agent-manager relationship between a base station system and an operation and maintenance center for carrying out at least two applications for the base station system.

Figure 3 shows a block diagram of agents and managers for dealing with events for data realignment processes that are carried out in parallel or sequentially.

Figure 4 shows a message flow between a manager and the agent for controlling the data filtering, using the example of alarms for data realignment.

Page 9, between lines 10 and 11, please insert the following heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace the consecutive paragraphs beginning at line 11 of page 9 with the following rewritten paragraphs:

The exemplary embodiment describes the invention on the basis of an example of a TMN concept for the management of a mobile communications system which has, by way of example, network elements for a mobile radio network in accordance with the UMTS or GSM Standard. However, the concept is not restricted to mobile radio networks but can be applied to telecommunications networks of any type which use a TMN management network or the like.

A mobile communications system is a hierarchically subdivided system of different network elements, in which the lowermost hierarchy level is formed by the mobile stations. These mobile stations communicate via a radio interface with radio stations which form the next hierarchy level and are referred to as base stations. The base stations, which, for example, supply mobile stations in a radio area of a radio cell, are preferably combined in order to cover a relatively large radio region, and are connected to higher-level network elements, the base station controllers. The base stations and base station controllers are part of a base station system (base station subsystem) in the mobile communications system. The base station controllers

communicate via defined interfaces with one or more switching centers, the mobile switching centers, via which, handovers to other communications networks are also handled. The mobile switching centers together with a number of databases form the switching system (switching subsystem) of the mobile communications system.

In addition to the above network elements, there are one or more operation and maintenance centers which are used for configuring and monitoring the network elements. Monitoring measures and configuration means are for this purpose generally remotely controlled from the operation and maintenance center, and the operation and maintenance centers are normally arranged in the area of the mobile switching centers. An operation and maintenance center in this case communicates with each base station system or switching system via a defined interface. The operation and maintenance system has the further task of carrying out configuration management which, in addition to fault management, represents one of five management functional areas which identify the TMN principles. Configuration management defines a range of services which allow the structure to be changed, and hence allow the behavior of a telecommunications network to be changed, by the operator. These services always relate to instances of managed objects which, in total, form the network-specific management information base.

Please replace the paragraph beginning line 1 of page 11 with the following rewritten paragraph:

Figures 1 and 2 each show three levels A, B and C in the management network, of which the management level C includes the network element level with a number of base station systems BSS11, BSS12...BSS1N and BSS21, BSS22...BSS2M. The management level B denotes the network element management level, in which operation and maintenance centers OMC1 and OMC2 each provide the manufacturer-specific management functionality for individual subsystems, such as, in the present example, the operation and maintenance center OMC1 for the base station systems BSS11, BSS12...BSS1N, and the operation and maintenance center OMC2 for the base station systems BSS21, BSS22...BSS2M. The management level A denotes the network management level, in which network management centers NMC1 and NMC2 each provide an integrated management functionality, which is independent of the manufacturer. In this case, a number of network management centers can access the same network element in the next-lower management level B, in the present example the network management centers NMC1

and NMC2 of the next-higher management level C for the operation and maintenance center OMC1 of the next-lower management level B. Defined interfaces are provided for information transmission between the network elements in different management levels.

Please replace the consecutive paragraphs beginning at line 15 of page 13 with the following rewritten paragraphs:

As soon as an internal interface which is located in the management level C is ready to operate again, a request from the manager or managers results in the alarm data realignment process (also referred to as a realignment procedure or realignment method) being started, with the alarm data realignment process being controlled on a parameter-dependent basis by the manager. In this case, the alarm data realignment process in the present example first starts between the base station system, for example BSS11, and the applications OF1, OF2 in the operation and maintenance center OMC1 in parallel, and then continues in parallel between the operation and maintenance center OMC1 and the higher-level network management centers NMC1, NMC2. At the end of these procedures, the fault situation is updated not only in the OMC but also in the NMC once again. The realignment method can, of course, be restricted to updating of the alarm data between an agent and managers in two immediately adjacent management levels, for example level B and level A.

Figure 3 shows the layout of an agent AG and manager MA1, MA2, together with the elements which are required to carry out realignment procedures, which take place simultaneously - if there are two or more managers - or in serial form - if there is only one manager. Each manager MA1, MA2 and agent AG has a respective control device M-CTR or A-CTR, which can generate and evaluate the messages for the alarm data realignment process. In addition, they have transmitting/receiving devices - which are not illustrated in any more detail - for transmitting and receiving the messages, as well as memory devices for storing the alarm data and other user and signaling information.

Please replace the consecutive paragraphs beginning at line 8 of page 15 with the following rewritten paragraphs:

In particular, the combination of the basic functionality - use of the correlation information - with the configurable alignment functionality leads to a particularly effective

method and communications system. This results in optimum use of the transmission resources on the interface of the agent-manager relationship as well as provision, as quickly as possible, of the alarm data for active alarms which is desired by the manager for the next-higher management level by the agent. Resource utilization, time durations and flexibility are consequently further optimized with respect to the basic functionality in the communications system configured according to the invention. Furthermore, this applies not only to alarm management, but also, in general, to data realignment.

A number of filter functions EFD1, EFD2 (event forwarding discriminators), which can each be associated with the managers MA1, MA2 and can be controlled by them, in the agent AG can optionally also be used with filter criteria for the messages produced by the agent AG. In this regard, the messages with the alarm data are routed to the managers MA1, MA2 when the filter criteria are satisfied. The control device M-CTR for the manager is able to set up and to delete such filter functions in the agent AG and to define the filter criteria, in order to make it possible to control the message flow in accordance with its individual requirements. A situation can thus occur in which the filter function setting differs from one manager to another, so that the realignment procedures, which take place simultaneously, can deal with alarms having different contents and with associated alarm data.

Please replace the consecutive paragraphs beginning line 13 of page 16 with the following rewritten paragraphs:

The message flow preferably uses standardized M-EVENT-REPORT messages, which are sent as a consequence of an M-ACTION request initiated at the start. These are generic CMISE-standardized (Common Management Information Service Element) services, which are defined in accordance with ITU-T X.710. ITU-T X.733 defines the content of a standardized alarm transmission (alarm report), which is carried out in accordance with the M-EVENT-REPORT services. Correlation information is entered in the messages, or in specific message fields. The example in Figure 4 shows the message flow on the basis of individual messages, in which case these can be transmitted in parallel between the agent AG and the managers MA1, MA2, or in serial form between the agent AG and the single manager MA1, as is already known, for example, from DE 198 01 785.

The following features, which are specified in the ITU-T X.721 Standard, are used in particular in the exemplary embodiment described here, for example for an alarm alignment example.

- Standardized notifications (alarm notification, state change notification, attribute value change notification, object creation notification, object deletion notification) which may be used for an alignment method includes the additional text as an optional parameter (attribute).
- The definition of the additional text parameter (of the GraphicString type, that is to say a character string) includes the following clause:

"Matching terms for equality, substrings". ("MATCHES FOR EQUALITY, SUBSTRINGS").

According to the ITU-T X.722 Standard, this attribute can be tested for the presence of a specific sub-character string (SUBSTRING). The test result may also be used, in particular in EFD or LOG instances, as a filter criterion for those notifications which include this attribute.

Please replace the consecutive paragraphs beginning at line 35 of page 17 with the following rewritten paragraphs:

Whenever a manager (for example the manager 2) starts an alignment process, it replaces the default filter setting for its EFD instance in the agent by an alignment filter setting in the form of the following clause, which is once again described here in the form of plain text:

<Each notification with the SUBSTRINGS "(aaaa-ALIGNMENT" or "(aaaa-ENDALIGNMENT" in the additional text field is not filtered out.>,

where "aaaa" is a number which uniquely identifies that particular manager. This number may, for example, be allocated by the agent whenever a connection is set up to that particular manager.

Whenever the communication between a manager (for example the manager 2) and an agent is set up again, for example after an interruption in the connection, this manager sends a CMISE-standardized M-ACTION instruction with the following parameters to the agent:

Action type:	*	"requestDataSynchronisation".
Action information:	*	"Manager-Handling" (managerHandle), for example a previously defined value aaaa). This unique number is used by the agent as a response to this particular manager request for identification of subsequently

transmitted notifications.

* "Alignment-Handling" (alignment-Handle), for example with a value abc. This parameter uniquely identifies that particular alignment process for the manager 2. As the criterion 9 mentioned above specifies, the manager associates the received, alignment-related notifications with the correct alignment process, even when a number of its own alignment procedures are intended to be carried out at the same time.

* "Datatype" (dataType).
  This parameter specifies the nature of the data which is intended to be synchronized between the agent and the manager,
  that is to say, for example, alarms, states or configuration changes.

* "related units" (relatedEntities)
  This parameter indicates the network units from which the requested data should originate (for example from a specific network region).

* "related time interval" (relatedTimeInterval).
  This parameter specifies the time frame in which the notifications to be sent by the agent originated, for example all alarms between 18:00 and 20:00 hrs.

* "specific parameters" (specificParameters).
  Depending on the "data type" (dataType) parameter defined above, specific parameters are defined in this field, for

example for alarms with a specific perceived "Severity value" (Severity value).

After confirmation of the request by means of an "M-ACTION Response", the agent successively sends the relevant notifications to the EFD instances that are present (in accordance with ITU-T Standard X.734). With the exception of the last notification, each notification which is sent for data realignment or alignment contains the character string "(aaaa-ALIGNMENT-abc)", where aaaa and abc have the already explained meanings, at the start of the additional text field.

Please replace the paragraph beginning line 15 of page 20 with the following rewritten paragraph:

The separate filter setting of the EFD instance for the manager 2 ensures that the notifications sent by the agent for the alignment can pass through this one discriminator. Even if another manager (manager 1) starts an alignment procedure at the same time with, for example, the unique "alignmentHandle" = "bbbb", the manager 2 receives "its" notifications, with the identifier aaaa.

Please replace the paragraph beginning line 30 of page 20 with the following rewritten paragraph:

During the alignment procedure, newly created notifications, which are not sent as a consequence of an alignment procedure that is currently taking place and therefore do not include any special strings, can in principle pass through all the EFD instances (for example notification 3 in Figure 4), that is to say they can reach all the higher-level managers.

In the Claims:

What is claimed is:

1. (Amended) A method for data realignment using a management network which has at least two management levels, comprising:

transmitting data for data realignment between at least one agent in one management level and at least one manager in a next-higher management level;

sending one or more request messages to transmit the data to the at least one agent; and

transmitting correlation information for association of the respective request with the messages that are sent by the at least one agent, wherein

filter devices receive the data from the agents independently of the manager and pass the received data to the manager on the basis of the correlation information, with the filter devices being generic and/or independent of the actual functions of agents and managers.

2. (Amended) The method as claimed in claim 1, in which the data which is to be realigned during data realignment is alarm data.

3. (Amended) The method as claimed in claim 1, in which before transmission, the manager inserts the correlation information into an optional additional field.

4. (Amended) The method as claimed in claim 1, in which components of the corresponding managers, of the agents or of units connected between a manager and an agent are used as filter devices.

5. (Amended) The method as claimed in claim 1, in which event forwarding discriminators, log discriminators or other units with filter capabilities are used as filter devices.

6. (Amended) The method as claimed in claim 1, in which a default filter setting of an additional field of each filter device is set, as standard, to filter out data realignment data.

7. (Amended) The method as claimed in claim 6, in which the filter setting of the additional field of the filter device of the manager requesting data realignment is reset to the default filter setting after data realignment.

8. (Amended) The method as claimed in claim 1, in which a filter setting of an additional field of the filter device of the manager requesting data realignment is set to filter out external data realignment data.

9. (Amended) The method as claimed in claim 1, in which agents sending data realignment data transmit the data with the correlation information in the additional field to the filter devices of the managers.

10. (Amended) A communications system having a management network which has at least two management levels, comprising:

managing devices configured for use as managers and/or as an agent; and

realignment devices for data realignment,

the devices for data realignment having autonomous filter devices, which are arranged as autonomous functional units between the actual functional units of managers and agents.

11. (Amended) The communications system as claimed in claim 10, in which devices for setting filter information and/or correlation information in associated filter devices are provided in the manager.

12. (Amended) The communications system as claimed in claim 10, in which devices for setting filter information and/or correlation information in additional fields of data information which is to be transmitted via at least one filter device to a manager are provided in the agent.

13. (Amended) The communications system as claimed in claim 10, in which the filter devices are components of the corresponding managers, agents, or of units which are connected separately between a manager and an agent.

14. (Amended) The communications system as claimed in claim 10, in which the filter devices are event forwarding discriminators, LOG discriminators or other units with filter capabilities.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

REMARKS

The above amendments to the specification, claims, and abstract have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 449122023800. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: February 25, 2002

Kevin R. Spivak
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Facsimile: (202) 263-8396

VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Specification:

Page 1, before the first paragraph, please delete the following:

~~Description~~

Page 1, between lines 4 and 5, please insert the following headings and paragraph:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/02827 which was published in the German language on August 18, 2000.

TECHNICAL FIELD OF THE INVENTION

Please replace the paragraph beginning line 5 of page 1 with the following rewritten paragraph:

The invention relates to a method and a communications system for data realignment, and in particular, by ~~means of~~ a management network which has at least two management levels~~, as claimed in the precharacterizing features of claim 1, in which case, in particular, the alarm data for active alarms is transmitted for, for example, generic alarm data realignment between an agent in one management level and a manager in a next higher management level~~.

Page 1, between lines 13 and 14, please insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 14 of page 1 with the following rewritten paragraphs:

The principles of a management network, which are also referred to as TMN principles (TMN: Telecommunications Management Network), define a number of management levels for

the management of a communications system –(e.g. of a mobile communications system—) in which each level has two functions. In the managing system, each level except for the lowest level has a manager function for the level below it. In the managed system, each level apart from the uppermost level has an agent function for the next-higher level.

Fault management is, for example, an important part of TMN management. As a rule, the agent in this case plays the active role, by identifying fault events in good time and accurately to its own management level and by transmitting event reports (for example alarm reports) to the manager of the next-higher level. The transmission of event data from the agent to the manager is not critical, provided there is no disturbance to the communication mechanism between these systems. If the link between the two management levels, ~~that is to say~~ e.g. between agent and manager, is no longer ensured for a certain time, the agent must temporarily store the events which have occurred during this interval~~, in order to~~ This ensures that, once the communications capability has been restored, the manager is first ~~of all~~ provided as quickly as possible with an overview of the current network state–, for example for active alarms in the form of a list~~–and secondly~~. Secondly, the manager can build up a history of the events (event history) with as few gaps as possible, for example a history of both the active alarms and the cleared alarms.

To this end, data realignment is carried out between the agent and manager whenever a new connection is set up after a connection termination or after initialization of the agent or of the manager. All alarm data for active alarms for which faults in the agent have not yet been rectified - identifiable from the fact that they are not identified as cleared alarms - must ~~thus~~ be made available to the next-higher management level completely and as quickly as possible.

Please replace the paragraph beginning line 11 of page 3 with the following rewritten paragraph:

Since the alarm data realignment process ~~there~~ is controlled by the manager as a function of at least one parameter sent to the agent, the alarm data realignment for the manager can be configured with respect to the basic functionality. This means that it is no longer essential for the agent to send all the active alarms, but only those which are defined in more detail by the transmitted parameters. This provides the manager with a selection function for a subset from all the alarms. Standardized messages are used for this purpose.

Please replace the paragraph beginning line 31 of page 3 with the following rewritten paragraph:

In a multimanager environment, the agent must ~~in general~~ be able to cope with tasks from a number of managers, even at the same time. On the other hand, a manager can carry out its function optimally only when all the relevant events (event reports) are received as quickly as possible from the lower-level agents. In normal conditions, ~~that is to say~~ e.g. when the communication between an agent and a manager, or agents and managers, is functioning, this is done by using an event reporting mechanism. In this case, after identifying an event, the agent generates a corresponding message. In addition to the ~~already mentioned~~ alarm messages, these are, for example, messages or notifications relating to a state change, object creation, object deletion or attribute value changes (attribute value change notification). These messages are sent to event forwarding discriminators, so-called EFDs, which may be located in the agent.

Please replace the paragraph beginning line 26 of page 4 with the following rewritten paragraph:

As described, there are various situations in which general data realignment is necessary, ~~with regard in particular to~~ alarms, states, configuration changes between a manager or managers and an agent or agents, going beyond the normal event reporting mechanism, for example after a connection has been cleared or after initialization of the agent or manager. This alignment is generally started in response to a manager request.

Please replace the consecutive paragraphs beginning at line 7 of page 6 with the following rewritten paragraphs:

Until now, there have been two fundamental types of data realignment or alignment methods:

a) The manager sends a request (M-ACTION request in accordance with ITU-T Standard X.710) to the agent, containing the alignment parameters and a unique number. First ~~of all~~, the agent sends a so-called start alignment notification - for the correlation of all the notifications sent using the alignment method with the manager request ~~and then~~. Then the agent sends the alignment notification to all the EFD instances. The end of the alignment procedure is signaled to the manager by means of a CMISE-standardized M-ACTION response, or by means of a separate end alignment notification (CMISE: Common Management Information Service Element).

~~However, t~~This method, which is already used in mobile radio systems, has disadvantages~~,~~ since non-standardized notifications (start alignment/ end alignment) are introduced. Furthermore, in a multimanager environment, the notifications which are sent using a specific alignment process are also disadvantageously received by all the other managers~~, and this~~. This results in unnecessary notifications and notifications received more than once. The above criteria 1 and 8 are thus not satisfied.

b) The manager sends a request, a CMISE-standardized M-ACTION request, which contains the alignment parameters, also including the filter criteria for this alignment procedure. In this case, the agent must first ~~of all~~ determine the notifications which correspond to those criteria. The agent then forms an M-ACTION response with all these notifications, and sends this to the request originator or manager.

This method likewise has disadvantages, since it means a specific implementation, because the agent must first ~~of all~~ check all the potential notifications in accordance with the filter criteria contained in the M-ACTION request. This leads to the alignment procedure lasting for a longer time. Furthermore, the alignment notifications do not use the same filters with regard to the event report or event reporting (in the EFD) and with regard to the event logging (LOG) as the normal notifications. In consequence, the above criteria 1, 5 and 6 are not satisfied.

Page 7, between lines 18 and 19, please insert the following heading and paragraph:

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a system and method of data realignment by a management network having at least two management levels. Alarm data for active alarms is transmitted as, for example, generic alarm data realignment between an agent in one management level and a manager in a next-higher management level.

Please delete the paragraph beginning at line 19 of page 7 in its entirety.
Please delete the paragraph beginning at line 26 of page 7 in its entirety.

Please replace the consecutive paragraphs beginning at line 32 of page 7 with the following rewritten paragraphs:

~~The proposed method is~~ In one aspect of the method, there is a generic method for carrying out an alignment procedure~~, which satisfies all the criteria mentioned above~~. This means, in particular, that it is independent of the transmitted information and manager/agent implementations.

~~Furthermore, n~~No additional notifications that have not yet been defined in the Standards are required. This means simple implementation, compliant with the Standards, in the agent, and simple correlation in the manager between the request and alignment notifications.

~~The i~~Interposition of the filter units between the actual functional units of managers and agents reduces the load on them in favor of their routine tasks. There is no longer any need for autonomous filter functions for associating data realignment data with specific managers, in the managers and agents.

Page 8, between lines 23 and 24, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the paragraph beginning line 24 of page 8 with the following rewritten paragraph:

The invention will be explained in more detail in the following text using exemplary embodiments and with reference to the figures, in which:

Figure 1 shows ~~the~~ a block diagram of a management network for a mobile communications system with an agent-manager relationship between an operation and maintenance center and one or more network management centers~~;~~.

Figure 2 shows ~~the~~ a block diagram of the management network as shown in Figure 1, with an agent-manager relationship between a base station system and an operation and maintenance center for carrying out at least two applications for the base station system~~;~~.

Figure 3 shows ~~the~~ a block diagram of agents and managers for dealing with events for data realignment processes that are carried out in parallel or sequentially~~; and~~.

Figure 4 shows ~~the~~ a message flow between a manager and the agent for controlling the data filtering, using the example of alarms for data realignment.

Page 9, between lines 10 and 11, please insert the following heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace the consecutive paragraphs beginning at line 11 of page 9 with the following rewritten paragraphs:

The exemplary embodiment describes the invention on the basis of an example of a TMN concept for the management of a mobile communications system which has, by way of example, network elements for a mobile radio network in accordance with the UMTS or GSM Standard. However, the concept is not restricted to mobile radio networks but can be applied to telecommunications networks of any type which use a TMN management network or the like.

A mobile communications system is a hierarchically subdivided system of different network elements, in which the lowermost hierarchy level is formed by the mobile stations. These mobile stations communicate via a radio interface with radio stations which form the next hierarchy level and are referred to as base stations. The base stations, which, for example, supply mobile stations in a radio area of a radio cell, are preferably combined in order to cover a relatively large radio region, and are connected to higher-level network elements, the base station controllers. The base stations and base station controllers are part of a base station system (base station subsystem) in the mobile communications system. The base station controllers communicate via defined interfaces with one or more switching centers, the mobile switching centers, via which, ~~inter alia,~~ handovers to other communications networks are also handled. The mobile switching centers together with a number of databases form the switching system (switching subsystem) of the mobile communications system.

In addition to the above network elements, there are one or more operation and maintenance centers which are used~~, inter alia,~~ for configuring and monitoring the network elements. Monitoring measures and configuration means are for this purpose generally remotely controlled from the operation and maintenance center, and the operation and maintenance centers are normally arranged in the area of the mobile switching centers. An operation and maintenance center in this case communicates with each base station system or switching system via a defined interface. The operation and maintenance system has the further task of carrying out configuration management which, in addition to fault management, represents one of five management functional areas which identify the TMN principles. Configuration management

defines a range of services which allow the structure to be changed, and hence allow the behavior of a telecommunications network to be changed, by the operator. These services always relate to instances of managed objects which, in total, form the network-specific management information base.

Please replace the paragraph beginning line 1 of page 11 with the following rewritten paragraph:

Figures 1 and 2 each show three levels A, B and C in the management network, of which the management level C ~~contains~~ includes the network element level with a number of base station systems BSS11, BSS12...BSS1N and BSS21, BSS22...BSS2M. The management level B denotes the network element management level, in which operation and maintenance centers OMC1 and OMC2 each provide the manufacturer-specific management functionality for individual subsystems, such as, in the present example, the operation and maintenance center OMC1 for the base station systems BSS11, BSS12...BSS1N, and the operation and maintenance center OMC2 for the base station systems BSS21, BSS22...BSS2M. The management level A denotes the network management level, in which network management centers NMC1 and NMC2 each provide an integrated management functionality, which is independent of the manufacturer. In this case, a number of network management centers can access the same network element in the next-lower management level B, in the present example the network management centers NMC1 and NMC2 of the next-higher management level C for the operation and maintenance center OMC1 of the next-lower management level B. Defined interfaces are provided for information transmission between the network elements in different management levels.

Please replace the consecutive paragraphs beginning at line 15 of page 13 with the following rewritten paragraphs:

As soon as an internal interface which is located in the management level C is ready to operate again, a request from the manager or managers results in the alarm data realignment process~~, which is~~ (also referred to as a realignment procedure or realignment method)~~,~~ being started, with the alarm data realignment process being controlled~~, according to the invention,~~ on a parameter-dependent basis by the manager. In this case, the alarm data realignment process in the present example first ~~of all~~ starts between the base station system, for example BSS11, and

the applications OF1, OF2 in the operation and maintenance center OMC1 in parallel, and then continues in parallel between the operation and maintenance center OMC1 and the higher-level network management centers NMC1, NMC2. At the end of these procedures, the fault situation is updated not only in the OMC but also in the NMC once again. The realignment method can, of course, be restricted to updating of the alarm data between an agent and managers in two immediately adjacent management levels, for example level B and level A.

Figure 3 shows~~, illustrated schematically,~~ the layout of an agent AG and manager MA1, MA2, together with the elements which are required to carry out realignment procedures, which take place simultaneously - if there are two or more managers - or in serial form - if there is only one manager. Each manager MA1, MA2 and agent AG has a respective control device M-CTR or A-CTR, which can generate and evaluate the messages for the alarm data realignment process. In addition, they have transmitting/receiving devices - which are not illustrated in any more detail - for transmitting and receiving the messages, as well as memory devices for storing the alarm data and other user and signaling information.

Please replace the consecutive paragraphs beginning at line 8 of page 15 with the following rewritten paragraphs:

In particular, the combination of the basic functionality - use of the correlation information - with the configurable alignment functionality leads to a particularly effective method and communications system~~, which~~. This results in optimum use of the transmission resources on the interface of the agent-manager relationship as well as provision, as quickly as possible, of ~~only that~~ the alarm data for active alarms which is desired by the manager for the next-higher management level by the agent. Resource utilization, time durations and flexibility are ~~in consequence~~ consequently further optimized with respect to the basic functionality in the communications system configured according to the invention. Furthermore, this applies not only to alarm management, but also, in general, to data realignment.

A number of filter functions EFD1, EFD2 (event forwarding discriminators), which can each be associated with the managers MA1, MA2 and can be controlled by them, in the agent AG can optionally also be used with filter criteria for the messages produced by the agent AG~~, so that~~. In this regard, the messages with the alarm data are routed to the managers MA1, MA2 ~~only~~ when the filter criteria are satisfied. The control device M-CTR for the manager is able to

set up and to delete such filter functions in the agent AG and to define the filter criteria, in order to make it possible to control the message flow in accordance with its individual requirements. A situation can thus occur in which the filter function setting differs from one manager to another, so that the realignment procedures, which take place simultaneously, can deal with alarms having different contents and with associated alarm data.

Please replace the consecutive paragraphs beginning line 13 of page 16 with the following rewritten paragraphs:

The message flow preferably uses standardized M-EVENT-REPORT messages, which are sent as a consequence of an M-ACTION request initiated at the start. These are generic CMISE-standardized (Common Management Information Service Element) services, which are defined in accordance with ITU-T X.710. ITU-T X.733 defines the content of a standardized alarm transmission (alarm report), which is carried out in accordance with the M-EVENT-REPORT services. Correlation information is entered in the messages, or in specific message fields. The example in Figure 4 shows the message flow ~~only~~ on the basis of individual messages, in which case these can be transmitted in parallel between the agent AG and the managers MA1, MA2, or in serial form between the agent AG and the single manager MA1, as is already known, for example, from DE 198 01 785.

The following features, which are specified in the ITU-T X.721 Standard, are used in particular in the exemplary embodiment described here, for example for an alarm alignment example.

- ~~Every s~~Standardized notifications (alarm notification, state change notification, attribute value change notification, object creation notification, object deletion notification) which may be used for an alignment method ~~contains~~ includes the additional text as an optional parameter (attribute).
- The definition of the additional text parameter (of the GraphicString type, that is to say a character string) ~~contains~~ includes the following clause:

"Matching terms for equality, substrings". ("MATCHES FOR EQUALITY, SUBSTRINGS").

According to the ITU-T X.722 Standard, this attribute can be tested for the presence of a specific sub-character string (SUBSTRING). The test result may also be used, in particular in

EFD or LOG instances, as a filter criterion for those notifications which ~~contain~~ include this attribute.

Please replace the consecutive paragraphs beginning at line 35 of page 17 with the following rewritten paragraphs:

Whenever a manager (for example the manager 2) starts an alignment process, it replaces the default filter setting for its EFD instance in the agent by an alignment filter setting in the form of the following clause, which is once again described here in the form of plain text:

<Each notification with the SUBSTRINGS "(aaaa-ALIGNMENT" or "(aaaa-ENDALIGNMENT" in the additional text field is not filtered out.>,

where "aaaa" is a number which uniquely identifies that particular manager. This number may, for example, be allocated by the agent whenever a connection is set up to that particular manager.

Whenever the communication between a manager (for example the manager 2) and an agent is set up again, for example after an interruption in the connection, this manager sends a CMISE-standardized M-ACTION instruction with the following parameters to the agent:

Action type:	*	"requestDataSynchronisation".
Action information:	*	"Manager-Handling" (managerHandle), for example a previously defined value aaaa). This unique number is used by the agent as a response to this particular manager request for identification of ~~all~~ subsequently transmitted notifications.
	*	"Alignment-Handling" (alignment-Handle), for example with a value abc. This parameter uniquely identifies that particular alignment process for the manager 2. As the criterion 9 mentioned above specifies, the manager ~~must~~ associates the received, alignment-related notifications with the correct alignment process, even when a number of its own alignment procedures are intended to be carried out at

the same time.

* "Datatype" (dataType).
  This parameter specifies the nature of the data which is intended to be synchronized between the agent and the manager,
  that is to say, for example, alarms, states or configuration changes.

* "related units" (relatedEntities)
  This parameter indicates the network units from which the requested data should originate (for example from a specific network region).

* "related time interval" (relatedTimeInterval).
  This parameter specifies the time frame in which the notifications to be sent by the agent originated, for example all alarms between 18:00 and 20:00 hrs.

"specific parameters" (specificParameters).

* Depending on the "data type" (dataType) parameter defined above, specific parameters are defined in this field, for example for alarms~~, only those~~ with a specific ~~perceived Severity value)~~ perceived "Severity value" (Severity value).

After confirmation of the request by means of an "M-ACTION Response", the agent successively sends ~~all~~ the relevant notifications to ~~all~~ the EFD instances that are present (in accordance with ITU-T Standard X.734). With the exception of the last notification, each notification which is sent for data realignment or alignment contains the character string "(aaaa-ALIGNMENT-abc)", where aaaa and abc have the already explained meanings, at the start of the additional text field.

Please replace the paragraph beginning line 15 of page 20 with the following rewritten paragraph:

The separate filter setting of the EFD instance for the manager 2 ensures that the notifications sent by the agent for the alignment can pass ~~only~~ through this one discriminator. Even if another manager (manager 1) starts an alignment procedure at the same time with, for example, the unique "alignmentHandle" = "bbbb", the manager 2 receives ~~only~~ "its" notifications, with the identifier aaaa.

Please replace the paragraph beginning line 30 of page 20 with the following rewritten paragraph:

During the alignment procedure, newly created notifications, which are not sent as a consequence of an alignment procedure that is currently taking place and therefore do not include any special strings, can in principle pass through all the EFD instances (for example notification 3 in Figure 4), that is to say they can reach all the higher-level managers.

In the Claims:

~~Patent Claims~~

What is claimed is:

1. (Amended) A method for data realignment ~~by means of~~ using a management network which has at least two management levels ~~(A, B, C) with data being transmitted~~, comprising:

transmitting data for data realignment between at least one agent ~~(AG)~~ in one management level ~~(B, C)~~ and at least one manager ~~(MA1, MA2)~~ in a next-higher management level ~~(A, B), in which~~;

~~the manager (MA1, MA2) in each case sends~~ sending one or more request messages to transmit the data to the at least one agent ~~(AG)~~;; and

~~with the manager (MA1, MA2)~~ transmitting correlation information for association of the respective request with the messages that are ~~subsequently~~ sent by the at least one agent ~~(AG)~~, wherein ~~characterized~~

~~in that~~ filter devices ~~(EFD) are used, which~~ receive the data from the agents ~~(AG)~~ independently of the ~~requesting~~ manager~~,~~ and pass the received data ~~only~~ to the ~~requesting~~ manager on the basis

of the correlation information, with the filter devices being generic and/or independent of the actual functions of agents and managers.

2. (Amended) The method as claimed in claim 1, in which the data which is to be realigned during data realignment is alarm data~~, in particular active alarms, state changes or configuration changes~~.

3. (Amended) The method as claimed in claim 1 ~~or 2~~, in which before transmission, the manager inserts the correlation information into an optional additional field~~, in particular an additional text field~~.

4. (Amended) The method as claimed in ~~a preceding claim~~ claim 1, in which components of the corresponding managers ~~(MA1, MA2, MAn)~~, of the agents ~~(AG)~~ or of units connected between a manager and an agent are used as filter devices ~~(EFD)~~.

5. (Amended) The method as claimed in ~~a preceding claim~~ claim 1, in which event forwarding discriminators, log discriminators or other units with filter capabilities are used as filter devices ~~(EFD)~~.

6. (Amended) The method as claimed in ~~a preceding claim~~ claim 1, in which ~~the~~ a default filter setting of an additional field ~~(additional text)~~ of each filter device ~~(EFD)~~ is set, as standard, to filter out ~~all~~ data realignment data.

7. (Amended) The method as claimed in claim 6, in which the filter setting of the additional field ~~(additional text)~~ of the filter device ~~(EFD)~~ of the manager ~~(MA2)~~ requesting data realignment is reset to the default filter setting after data realignment.

8. (Amended) The method as claimed in ~~a preceding claim~~ claim 1, in which ~~the~~ a filter setting of an additional field ~~(additional text)~~ of the filter device ~~(EFD)~~ of the manager ~~(MA2)~~ requesting data realignment is set to filter out ~~all~~ external data realignment data.

9. (Amended) The method as claimed in ~~a preceding claim~~ claim 1, in which ~~all~~ agents ~~(AG)~~ sending data realignment data transmit the data with the correlation information in the additional field to the filter devices ~~(EFD)~~ of ~~all~~ the managers.

10. (Amended) A communications system~~, in particular a radio communications system~~ having a management network which has at least two management levels ~~(A, B, C), having,~~ comprising:

managing devices configured for use ~~which can be used~~ as managers ~~(MA1, MA2, MAn)~~ and/or as an agent ~~(AG),~~; and

realignment devices for data realignment~~, using, in particular, a method as claimed in one of the preceding claims,~~

~~characterized~~

~~in that~~ the devices for data realignment ~~have~~ having autonomous filter devices ~~(EFDs)~~, which are arranged as autonomous functional units between the actual functional units of managers and agents.

11. (Amended) The communications system as claimed in claim 10, in which devices for setting filter information and/or correlation information in associated filter devices ~~(EFD)~~ are provided in the manager ~~(MA1, MA2)~~.

12. (Amended) The communications system as claimed in claim 10 ~~or 11~~, in which devices for setting filter information and/or correlation information in additional fields of data information which is to be transmitted via at least one filter device ~~(EFD)~~ to a manager are provided in the agent ~~(AG)~~.

13. (Amended) The communications system as claimed in ~~one of claims 10-12~~ claim 10, in which the filter devices ~~(EFDs)~~ are components of the corresponding managers ~~(MA1, MA2, MAn)~~, agents ~~(AG)~~, or of units which are connected separately between a manager and an agent.

14. (Amended) The communications system as claimed in ~~one of claims 10-13~~ claim 10,

in which the filter devices are event forwarding discriminators ~~(EFD)~~, LOG discriminators or other units with filter capabilities.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

GENERIC ALIGNMENT METHOD IN A MULTIMANAGER ENVIRONMENT

Abstract

The invention relates to a method and a communications system for data realignment by means of a management network which has at least two management levels, with data being transmitted for data realignment between at least one agent in one management level and at least one manager in a next-higher management level, relating to spontaneous events. Here, the manager in each case sends one or more request messages to transmit the alarm data to the agent, with the manager transmitting correlation information for association of the respective request with the messages that are subsequently sent by the agent. In order to reduce the load on both the managers and the agents, the requested data is sent from the agent to the managers, together with the monitoring information inserted into an optional additional field. Filter devices which are inserted between the managers and the agent or agents pass only that data which is to be transmitted to the managers associated with it.

Description 2/prts

Generic alignment method in a multimanager environment

The invention relates to a method and a communications system for data realignment by means of a management network which has at least two management levels, as claimed in the precharacterizing features of claim 1, in which case, in particular, the alarm data for active alarms is transmitted for, for example, generic alarm data realignment between an agent in one management level and a manager in a next-higher management level.

The principles of a management network, which are also referred to as TMN principles (TMN: Telecommunications Management Network), define a number of management levels for the management of a communications system - for example of a mobile communications system -, in which each level has two functions. In the managing system, each level except for the lowest level has a manager function for the level below it. In the managed system, each level apart from the uppermost level has an agent function for the next-higher level.

Fault management is, for example, an important part of TMN management. As a rule, the agent in this case plays the active role, by identifying fault events in good time and accurately to its own management level and by transmitting event reports (for example alarm reports) to the manager of the next-higher level. The transmission of event data from the agent to the manager is not critical, provided there is no disturbance to the communication mechanism between these systems. If the link between the two management levels, that is to say between agent and manager, is no longer ensured for a certain time, the agent must temporarily store the events which have occurred during this interval, in order to ensure that, once the communications capability has been restored, the manager is first of all provided as quickly as possible

with an overview of the current network state - for example for active alarms in the form of a list - and, secondly, the manager can build up a history of the events (event history) with as few gaps as possible, for example a history of both the active alarms and the cleared alarms.

To this end, data realignment is carried out between the agent and manager whenever a new connection is set up after a connection termination or after initialization of the agent or of the manager. All alarm data for active alarms for which faults in the agent have not yet been rectified - identifiable from the fact that they are not identified as cleared alarms - must thus be made available to the next-higher management level completely and as quickly as possible.

DE 197 52 614 specifies such a method and communications system for dealing with alarms, which describe a basic functionality for the manager for requesting all the alarms from the agent. In this case, the agent sends the active alarms as a sequence of standardized M-EVENT-REPORTS, which are embedded in an M-ACTION request, which is initiated by the manager at the start, and are embedded in an M-ACTION response, which is initiated by the agent at the end. These are generic CMISE-standardized (Common Management Information Service Element) procedures, which are defined in accordance with ITU-T X.710 (ITU-T: International Telecommunication Union - Telecommunication sector). ITU-T X.733 defines the contents of a standardized alarm transmission (alarm report), which is produced in accordance with the M-EVENT-REPORTS services. All the M-EVENT-REPORT which are defined in the course of this M-ACTION are correlated unambiguously for each request by using correlation information. This allows the manager to associate these M-EVENT-REPORTS with a specific request and, furthermore, to distinguish them from other "regular" M-EVENT-REPORTS.

In DE 198 01 785, it is assumed that the alarm data for active alarms is transmitted for alarm data realignment between an agent in one management level and at least one manager in a next-higher management level. Furthermore, the manager sends one or more request messages to transmit the alarm data to the agent, and receives correlation information for association of the respective request with the messages containing the alarm data which are subsequently sent by the agent.

Since the alarm data realignment process there is controlled by the manager as a function of at least one parameter sent to the agent, the alarm data realignment for the manager can be configured with respect to the basic functionality. This means that it is no longer essential for the agent to send all the active alarms, but only those which are defined in more detail by the transmitted parameters. This provides the manager with a selection function for a subset from all the alarms. Standardized messages are used for this purpose.

This procedure allows the manager to specifically call those alarms which are particularly critical for the functionality and are thus important to that manager, while in the process significantly reducing the load on the interface to the agent resulting from the information flow, which is restricted to only specific alarms, in comparison to the conventional method in which all alarms are signaled automatically.

In a multimanager environment, the agent must in general be able to cope with tasks from a number of managers, even at the same time. On the other hand, a manager can carry out its function optimally only when all the relevant events (event reports) are received as quickly as possible from the lower-level agents. In normal conditions, that is to say when the communication between an agent and a manager, or agents and managers, is functioning, this is done by using an event reporting mechanism. In this case, after

identifying an event, the agent generates a corresponding message. In addition to the already mentioned alarm messages, these are, for example, messages or notifications relating to a state change, object creation, object deletion or attribute value changes (attribute value change notification). These messages are sent to event forwarding discriminators, so-called EFDs, which may be located in the agent.

The object of an EFD is to pass on or route to the manager only those reports which satisfy specific filter criteria. The manager has the capability to set up such EFDs in the agent, or to delete them, and to define the filter criteria. Each manager can thus control the information flow in accordance with its individual requirements at any time.

In an object-oriented environment, for example between a manager and an agent in a mobile radio network, each agent functionality is provided by a specific object as an instance in an object class. The object is produced as the result of a modeling activity (definition of an information model), and is known both to the manager and to the agent carrying it out.

As described, there are various situations in which general data realignment is necessary with regard in particular to alarms, states, configuration changes between a manager or managers and an agent or agents, going beyond the normal event reporting mechanism, for example after a connection has been cleared or after initialization of the agent or manager. This alignment is generally started in response to a manager request.

Particularly for use in a third-generation mobile radio system, such as UMTS (Universal Mobile Telecommunications System), an optimum alignment method, which is preferably capable of standardization, between a manager or managers and an agent or agents should satisfy as many of the following criteria as possible:

1. As far as possible, the method should use only standardized services/protocols and be of a generic nature, in order to avoid specific manager and/or agent implementations.

2. At least for the so-called mandatory parameters, the alignment information should include the same contents as the original notification, with this being particularly important for so-called dynamic information, such as alarms or states.

3. If the data realignment is controlled by the manager, the manager should be able to define the alignment start, and should be able to identify the alignment end, without any doubt.

4. The manager should be able to distinguish between an on-line (normal) notification and a notification which is received as a consequence of a previously started alignment procedure.

5. The notifications sent by the agent using the alignment procedure use the same EFDs as the normal notifications.

6. The same log settings as for the normal notifications apply to the notifications which are sent by the agent using the alignment procedure.

7. The manager may request a complete or only a partial alignment method, for example depending on certain parameter values.

8. In a multimanager environment, each manager should receive only those notifications which are sent as a consequence of an alignment procedure triggered by that manager itself, to be precise even when alignment processes are being carried out in parallel by a number of managers.

9. The manager can distinguish between notifications even when a number of its own alignment procedures are being carried out at the same time, for example for different data or network regions.

Until now, there have been two fundamental types of data realignment or alignment methods:

a) The manager sends a request (M-ACTION request in accordance with ITU-T Standard X.710) to the agent, containing the alignment parameters and a unique number. First of all, the agent sends a so-called start alignment notification - for the correlation of all the notifications sent using the alignment method with the manager request - and then sends the alignment notification to all the EFD instances. The end of the alignment procedure is signaled to the manager by means of a CMISE-standardized M-ACTION response, or by means of a separate end alignment notification (CMISE: Common Management Information Service Element).

However, this method, which is already used in mobile radio systems, has disadvantages, since non-standardized notifications (start alignment/ end alignment) are introduced. Furthermore, in a multimanager environment, the notifications which are sent using a specific alignment process are also disadvantageously received by all the other managers, and this results in unnecessary notifications and notifications received more than once. The above criteria 1 and 8 are thus not satisfied.

b) The manager sends a request, a CMISE-standardized M-ACTION request, which contains the alignment parameters, also including the filter criteria for this alignment procedure. In this case, the agent must first of all determine the notifications

which correspond to those criteria. The agent then forms an M-ACTION response with all these notifications, and sends this to the request originator or manager.

This method likewise has disadvantages, since it means a specific implementation, because the agent must first of all check all the potential notifications in accordance with the filter criteria contained in the M-ACTION request. This leads to the alignment procedure lasting for a longer time. Furthermore, the alignment notifications do not use the same filters with regard to the event report or event reporting (in the EFD) and with regard to the event logging (LOG) as the normal notifications. In consequence, the above criteria 1, 5 and 6 are not satisfied.

The object of this invention is to propose such a method and communications system for data realignment in a management network having a number of management levels, which is suitable for different management data and which allows data realignment between an agent and at least one manager to be improved further.

With regard to the method, this object is achieved by the features of patent claim 1, and with regard to the communications system, it is achieved by the features of patent claim 10. Advantageous developments are the subject matter of dependent claims.

The proposed method is a generic method for carrying out an alignment procedure, which satisfies all the criteria mentioned above. This means, in particular, that it is independent of the transmitted information and manager/agent implementations.

Furthermore, no additional notifications that have not yet been defined in the Standards are required. This means simple implementation, compliant with the

Standards, in the agent, and simple correlation in the manager between the request and alignment notifications.

The interposition of the filter units between the actual functional units of managers and agents reduces the load on them in favor of their routine tasks. There is no longer any need for autonomous filter functions for associating data realignment data with specific managers, in the managers and agents.

The filter units to be arranged in the output or outlet areas of the agents reduces the loads on the communications network located between the agents and managers, and on the devices located in between them, in a particularly advantageous manner.

The use of optional additional fields, in particular the additional text field, makes it possible to use the existing Standards without any redefinitions. Ideally, all that is required is programming changes to the control software in the managers and agents.

The invention will be explained in more detail in the following text using exemplary embodiments and with reference to the figures, in which:

Figure 1 shows the block diagram of a management network for a mobile communications system with an agent-manager relationship between an operation and maintenance center and one or more network management centers,

Figure 2 shows the block diagram of the management network as shown in Figure 1, with an agent-manager relationship between a base station system and an operation and maintenance center for carrying out at least two applications for the base station system,

Figure 3 shows the block diagram of agents and managers for dealing with events for data realignment processes that are carried out in parallel or sequentially, and

Figure 4 shows the message flow between a manager and the agent for controlling the data filtering, using the example of alarms for data realignment.

The exemplary embodiment describes the invention on the basis of an example of a TMN concept for the management of a mobile communications system which has, by way of example, network elements for a mobile radio network in accordance with the UMTS or GSM Standard. However, the concept is not restricted to mobile radio networks but can be applied to telecommunications networks of any type which use a TMN management network.

A mobile communications system is a hierarchically subdivided system of different network elements, in which the lowermost hierarchy level is formed by the mobile stations. These mobile stations communicate via a radio interface with radio stations which form the next hierarchy level and are referred to as base stations. The base stations, which, for example, supply mobile stations in a radio area of a radio cell, are preferably combined in order to cover a relatively large radio region, and are connected to higher-level network elements, the base station controllers. The base stations and base station controllers are part of a base station system (base station subsystem) in the mobile communications system. The base station controllers communicate via defined interfaces with one or more switching centers, the mobile switching centers, via which, inter alia, handovers to other communications networks are also handled. The mobile switching centers together with a number of databases form the switching system (switching subsystem) of the mobile communications system.

In addition to the above network elements, there are one or more operation and maintenance centers which are used, inter alia, for configuring and monitoring the network elements. Monitoring measures and configuration means are for this purpose generally remotely controlled from the operation and maintenance center, and the operation and maintenance centers are normally arranged in the area of the mobile switching centers. An operation and maintenance center in this case communicates with each base station system or switching system via a defined interface. The operation and maintenance system has the further task of carrying out configuration management which, in addition to fault management, represents one of five management functional areas which identify the TMN principles. Configuration management defines a range of services which allow the structure to be changed, and hence allow the behavior of a telecommunications network to be changed, by the operator. These services always relate to instances of managed objects which, in total, form the network-specific management information base.

A managed object for the purposes of configuration management is a logical abstraction of a resource in the mobile communications system. In this case, a distinction is drawn between hardware-related managed objects, which describe a manufacturer-specific implementation of a function, and function-related managed objects, each of which is the abstraction of a manufacturer-independent functionality.

The TMN principles define a number of levels for the management of the mobile communications system, which is explained in the following text with reference to fault management, and of which levels three are explained in the following text for the present example, with reference to Figures 1 and 2.

Figures 1 and 2 each show three levels A, B and C in the management network, of which the management level C contains the network element level with a number of base station systems BSS11, BSS12...BSS1N and BSS21, BSS22...BSS2M. The management level B denotes the network element management level, in which operation and maintenance centers OMC1 and OMC2 each provide the manufacturer-specific management functionality for individual subsystems, such as, in the present example, the operation and maintenance center OMC1 for the base station systems BSS11, BSS12...BSS1N, and the operation and maintenance center OMC2 for the base station systems BSS21, BSS22...BSS2M. The management level A denotes the network management level, in which network management centers NMC1 and NMC2 each provide an integrated management functionality, which is independent of the manufacturer. In this case, a number of network management centers can access the same network element in the next-lower management level B, in the present example the network management centers NMC1 and NMC2 of the next-higher management level C for the operation and maintenance center OMC1 of the next-lower management level B. Defined interfaces are provided for information transmission between the network elements in different management levels.

The difference in the illustrations shown in Figures 1 and 2 is that an agent-manager relationship for dealing with alarms for one or more alarm data realignments in Figure 1 between the operation and maintenance center OMC1 (agent) and a network management center NMC1 (manager), or a number of - physically separated - network management centers NMC1, NMC2 (manager), and in Figure 2 between the base station system BSS11 (agent) and two different applications OF1 and OF2 (manager) exists in the operation and maintenance center OMC1, or between the operation and maintenance center OMC1 (agent) and two different applications NF1 and NF2 (manager) exists in the network management center NMC1. In order to ensure that there is an overview of the

fault situation at all times in the network management centers NMC1, NMC2, the operation and maintenance center OMC1 produces the alarm data, which is stored on the basis of, for example, faults which have occurred within the base station systems BSS11...BSS1N that are being supervised, for active alarms, and sends this data in parallel to both managers on request. This is preferably done after a connection has been cleared, or after initialization of the agent or of the manager. A number of requests may likewise also be sent successively from a single manager, for example the network management center NMC1, to the agent, for example the operation and maintenance center OMC1. Figure 1 shows the structure for requests, which are transmitted more than once according to the invention, for alarm data realignment, which, in the present example, run in parallel between the management level B, in which the agent in the form of the operation and maintenance center OMC1 is located, and the next-higher management level A, in which the managers of at least two network management centers NMC1, NMC2 are formed.

In order to ensure an overview of the fault situation at all times in the management level B as well, for example in the operation and maintenance center OMC1, the base station system BSS11 produces the alarm data, which is stored on the basis, for example, of faults which have occurred within the base stations and base station controllers which have been supervised, for active alarms, and sends this data in parallel to at least two managers of the operation and maintenance center OMC1 in the form of the different applications OF1 and OF2, which are both carried out by one and the same physical element OMC1. This is likewise preferably done after clearing a connection or after initialization of the agent or of the manager. Serial transmission of requests which are initiated more than once by an individual manager, for example the operation and maintenance center OMC1, to the agent, for example to the base station system BSS11, is

likewise possible. Alternatively or additionally, an agent-manager relationship may also exist between the operation and maintenance center OMC1 (an agent) and the network management center NMC1 (manager) for serial interchange of requests and alarm data or for parallel interchange of requests and alarm data for at least two different applications NF1 and NF2 (two managers) in the network management center NMC1. Figure 2 shows the structure for inventive alarm data realignment processes which take place in parallel between the management level B, in which the managers are located as applications OF1 and OF2, and the next-lower management level C, in which the agent is located.

As soon as an internal interface which is located in the management level C is ready to operate again, a request from the manager or managers results in the alarm data realignment process, which is also referred to as a realignment procedure or realignment method, being started, with the alarm data realignment process being controlled, according to the invention, on a parameter-dependent basis by the manager. In this case, the alarm data realignment process in the present example first of all starts between the base station system, for example BSS11, and the applications OF1, OF2 in the operation and maintenance center OMC1 in parallel, and then continues in parallel between the operation and maintenance center OMC1 and the higher-level network management centers NMC1, NMC2. At the end of these procedures, the fault situation is updated not only in the OMC but also in the NMC once again. The realignment method can, of course, be restricted to updating of the alarm data between an agent and managers in two immediately adjacent management levels, for example level B and level A.

Figure 3 shows, illustrated schematically, the layout of an agent AG and manager MA1, MA2, together with the elements which are required to carry out realignment procedures, which take place simultaneously - if there

are two or more managers - or in serial form - if there is only one manager. Each manager MA1, MA2 and agent AG has a respective control device M-CTR or A-CTR, which can generate and evaluate the messages for the alarm data realignment process. In addition, they have transmitting/receiving devices - which are not illustrated in any more detail - for transmitting and receiving the messages, as well as memory devices for storing the alarm data and other user and signaling information.

In this case, the control devices M-CTR for the managers MA1, MA2 insert into the respective request message for transmission of the alarm data by the agent correlation information which is used to associate the request with subsequently transmitted messages and which is unique, and initiates the transmission to the agent. Furthermore, the devices M-CTR for the managers MA1, MA2 individually insert one or more parameters par into each request message for control of the alarm data realignment process, in order deliberately to request specific alarms, which are identified by different parameter values. The respective request message is sent with the parameters par to the agent AG. The configurable alignment functionality according to the invention for the first time allows, for example, prioritization of the alarms and/or active control of the sequence of the requested alarms to be achieved.

The control device A-CTR for the agent AG receives the corresponding message with the parameters par, evaluates them and starts the realignment for the managers MA1, MA2 by sending back the alarms specifically requested by the managers. In this case, the unique correlation information which the managers MA1, MA2 enter in the request message is used for correlation of the requests, and one message is in each case sent with further correlation information in order to associate the messages (alarm notifications) that are subsequently sent by the agent with the

respectively started realignment in the next-higher management level. The further correlation information is also unique. The use of the correlation information allows a unique association of realignment processes which are carried out simultaneously or serially for a number of managers or for a single manager.

In particular, the combination of the basic functionality - use of the correlation information - with the configurable alignment functionality leads to a particularly effective method and communications system, which results in optimum use of the transmission resources on the interface of the agent-manager relationship as well as provision, as quickly as possible, of only that alarm data for active alarms which is desired by the manager for the next-higher management level by the agent. Resource utilization, time durations and flexibility are in consequence further optimized with respect to the basic functionality in the communications system configured according to the invention. Furthermore, this applies not only to alarm management, but also, in general, to data realignment.

A number of filter functions EFD1, EFD2 (event forwarding discriminators), which can each be associated with the managers MA1, MA2 and can be controlled by them, in the agent AG can optionally also be used with filter criteria for the messages produced by the agent AG, so that the messages with the alarm data are routed to the managers MA1, MA2 only when the filter criteria are satisfied. The control device M-CTR for the manager is able to set up and to delete such filter functions in the agent AG and to define the filter criteria, in order to make it possible to control the message flow in accordance with its individual requirements. A situation can thus occur in which the filter function setting differs from one manager to another, so that the realignment procedures, which take place simultaneously, can deal with alarms

having different contents and with associated alarm data.

Figure 4 shows the message flow between an agent AG - in the example illustrated in Figure 1 the operation and maintenance center OMC1 or, in the example illustrated in Figure 2 the base station system BSS11 - and the manager MA1, MA2,...MAn - in the example shown in Figure 1 the various network management centers NMC1, NMC2, or in the example shown in Figure 2 the various applications OF1, OF2.

The message flow preferably uses standardized M-EVENT-REPORT messages, which are sent as a consequence of an M-ACTION request initiated at the start. These are generic CMISE-standardized (Common Management Information Service Element) services, which are defined in accordance with ITU-T X.710. ITU-T X.733 defines the content of a standardized alarm transmission (alarm report), which is carried out in accordance with the M-EVENT-REPORT services. Correlation information is entered in the messages, or in specific message fields. The example in Figure 4 shows the message flow only on the basis of individual messages, in which case these can be transmitted in parallel between the agent AG and the managers MA1, MA2, or in serial form between the agent AG and the single manager MA1, as is already known, for example, from DE 198 01 785.

The following features, which are specified in the ITU-T X.721 Standard, are used in particular in the exemplary embodiment described here, for example for an alarm alignment example.

- Every standardized notification (alarm notification, state change notification, attribute value change notification, object creation notification, object deletion notification) which may be used for an

alignment method contains the additional text as an optional parameter (attribute).

- The definition of the additional text parameter (of the GraphicString type, that is to say a character string) contains the following clause: "Matching terms for equality, substrings". ("MATCHES FOR EQUALITY, SUBSTRINGS").

According to the ITU-T X.722 Standard, this attribute can be tested for the presence of a specific sub-character string (SUBSTRING). The test result may also be used, in particular in EFD or LOG instances, as a filter criterion for those notifications which contain this attribute.

The sequence of the example of an alignment procedure will now be explained with reference to the commands that are used.

In normal operation, the preset or default filter setting for each EFD instance in the agent contains the following clause, which is described in the form of plain text here:

> <Each notification with the character string "ALIGNMENT" in the additional text field is filtered out>.

The use of this clause in particular allows the EFDs to prevent a manager from receiving those notifications which are sent as a consequence of an alignment procedure initiated by another manager.

Whenever a manager (for example the manager 2) starts an alignment process, it replaces the default filter setting for its EFD instance in the agent by an alignment filter setting in the form of the following clause, which is once again described here in the form of plain text:

<Each notification with the SUBSTRINGS "(aaaa-ALIGNMENT" or "(aaaa-ENDALIGNMENT" in the additional text field is not filtered out.>,

where aaaa is a number which uniquely identifies that particular manager. This number may, for example, be allocated by the agent whenever a connection is set up to that particular manager.

Whenever the communication between a manager (for example the manager 2) and an agent is set up again, for example after an interruption in the connection, this manager sends a CMISE-standardized M-ACTION instruction with the following parameters to the agent:

Action type: * "requestDataSynchronisation".

Action information: * "Manager-Handling" (managerHandle), for example a previously defined value aaaa). This unique number is used by the agent as a response to this particular manager request for identification of all subsequently transmitted notifications.

* "Alignment-Handling" (alignment-Handle), for example with a value abc. This parameter uniquely identifies that particular alignment process for the manager 2. As the criterion 9 mentioned above specifies, the manager must associate the received, alignment-related notifications with the correct alignment process, even when a number of its own alignment procedures are intended to be

carried out at the same time.

* "Datatype" (dataType).
  This parameter specifies the nature of the data which is intended to be synchronized between the agent and the manager,
  that is to say, for example, alarms, states or configuration changes.

* "related units" (relatedEntities)
  This parameter indicates the network units from which the requested data should originate (for example from a specific network region).

* "related time interval" (relatedTimeInterval).
  This parameter specifies the time frame in which the notifications to be sent by the agent originated, for example all alarms between 18:00 and 20:00 hrs.

* "specific parameters" (specificParameters).
  Depending on the "data type" (dataType) parameter defined above, specific parameters are defined in this field, for example for alarms, only those with a specific perceivedSeverity value).

After confirmation of the request by means of an "M-ACTION Response", the agent successively sends all the

relevant notifications to all the EFD instances that are present (in accordance with ITU-T Standard X.734). With the exception of the last notification, each notification which is sent for data realignment or alignment contains the character string "(aaaa-ALIGNMENT-abc)", where aaaa and abc have the already explained meanings, at the start of the additional text field.

The last notification sent by the agent of this alignment process contains the character string "(aaaa-ENDALIGNMENT-abc)" at the start of the additional text field.

The separate filter setting of the EFD instance for the manager 2 ensures that the notifications sent by the agent for the alignment can pass only through this one discriminator. Even if another manager (manager 1) starts an alignment procedure at the same time with, for example, the unique "alignmentHandle" = "bbbb", the manager 2 receives only "its" notifications, with the identifier aaaa.

Figure 4 shows an example of a message interchange between a manager a and an agent for an alarm alignment procedure, with, for example, the "managerHandle" parameter having the value 78, and the alignmentHandle having the value 123, for example.

During the alignment procedure, newly created notifications, which are not sent as a consequence of an alignment procedure that is currently taking place and therefore do not contain any special strings, can in principle pass through all the EFD instances (for example notification 3 in Figure 4), that is to say they can reach all the higher-level managers.

The manager a is also able to identify the end of its alignment procedure, in this case the notification n with the unique identifier "(aaaa-ENDALIGNMENT-abc)".

At the end of the alignment procedure, that is to say after receiving the notification with the SUBSTRING "(aaaa-ENDALIGNMENT-abc)", the manager a resets the default filter setting.

If no alignment is required at the time of the manager request, for example because there are no active alarms, the manager a receives appropriate information in the "M-ACTION-Response" (action reply parameter).

Alternatively, the EFDs may also be a component of the corresponding managers, or of a unit connected between a manager and an agent. This is intended to relieve the manager itself of the load in that the information which is not intended for it is filtered out by the EFD associated with it, before arriving at that manager.

The same procedure can also be used for LOG discriminators or for any other comparable units designed with filter capabilities, or for a component of such units.

Patent Claims

1. A method for data realignment by means of a management network which has at least two management levels (A, B, C) with data being transmitted for data realignment between at least one agent (AG) in one management level (B, C) and at least one manager (MA1, MA2) in a next-higher management level (A, B), in which

- the manager (MA1, MA2) in each case sends one or more request messages to transmit the data to the agent (AG),
- with the manager (MA1, MA2) transmitting correlation information for association of the respective request with the messages that are subsequently sent by the agent (AG),

characterized

in that filter devices (EFD) are used, which receive the data from agents (AG) independently of the requesting manager, and pass the received data only to the requesting manager on the basis of correlation information, with the filter devices being generic and/or independent of the actual functions of agents and managers.

2. The method as claimed in claim 1, in which the data which is to be realigned during data realignment is alarm data, in particular active alarms, state changes or configuration changes.

3. The method as claimed in claim 1 or 2, in which before transmission, the manager inserts the correlation information into an optional additional field, in particular an additional text field.

4. The method as claimed in a preceding claim, in which

components of the corresponding managers (MA1, MA2, MAn), of the agents (AG) or of units connected between

a manager and an agent are used as filter devices (EFD).

5. The method as claimed in a preceding claim, in which
event forwarding discriminators, LOG discriminators or other units with filter capabilities are used as filter devices (EFD).

6. The method as claimed in a preceding claim, in which
the default filter setting of an additional field (additional text) of each filter device (EFD) is set, as standard, to filter out all data realignment data.

7. The method as claimed in claim 6, in which
the filter setting of the additional field (additional text) of the filter device (EFD) of the manager (MA2) requesting data realignment is reset to the default filter setting after data realignment.

8. The method as claimed in a preceding claim, in which
the filter setting of an additional field (additional text) of the filter device (EFD) of the manager (MA2) requesting data realignment is set to filter out all external data realignment data.

9. The method as claimed in a preceding claim, in which
all agents (AG) sending data realignment data transmit the data with the correlation information in the additional field to the filter devices (EFD) of all the managers.

10. A communications system, in particular a radio communications system having a management network which has at least two management levels (A, B, C), having
- devices which can be used as managers (MA1, MA2, MAn) and/or as an agent (AG),

- devices for data realignment using, in particular, a method as claimed in one of the preceding claims, characterized
in that the devices for data realignment have autonomous filter devices (EFDs), which are arranged as autonomous functional units between the actual functional units of managers and agents.

11. The communications system as claimed in claim 10, in which
devices for setting filter information and/or correlation information in associated filter devices (EFD) are provided in the manager (MA1, MA2).

12. The communications system as claimed in claim 10 or 11, in which
devices for setting filter information and/or correlation information in additional fields of data information which is to be transmitted via at least one filter device (EFD) to a manager are provided in the agent (AG).

13. The communications system as claimed in one of claims 10-12,
in which the filter devices (EFDs) are components of the corresponding managers (MA1, MA2, MAn), agents (AG), or of units which are connected separately between a manager and an agent.

14. The communications system as claimed in one of claims 10-13,
in which the filter devices are event forwarding discriminators (EFD), LOG discriminators or other units with filter capabilities.

Abstract

Generic alignment method in a multimanager environment

The invention relates to a method and a communications system for data realignment by means of a management network which has at least two management levels (A, B, C), with data being transmitted for data realignment between at least one agent (AG) in one management level (B, C) and at least one manager (MA1, MA2) in a next-higher management level (A, B), relating to spontaneous events (active alarms, state changes or configuration changes). Here, the manager (MA1, MA2) in each case sends one or more request messages to transmit the alarm data to the agent (AG), with the manager (MA1, MA2) transmitting correlation information for association of the respective request with the messages that are subsequently sent by the agent (AG).

In order to reduce the load on both the managers and the agents, the requested data is sent from the agent to all the managers, together with the monitoring information inserted into an optional additional field (additional text). Filter devices (EFD) which are inserted between the managers and the agent or agents pass only that data which is to be transmitted to the managers associated with it.

Figure 4

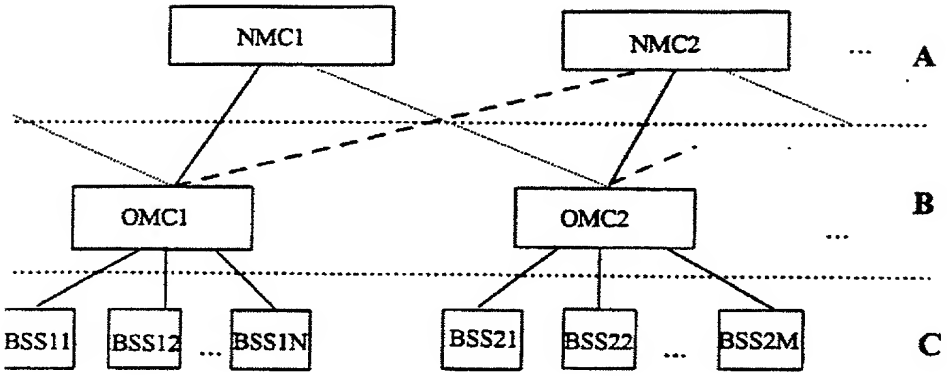
NMC1
NMC2
A
OMC1
OMC2
B
BSS11
BSS12
BSS1N
BSS21
BSS22
BSS2M
C

Fig. 1

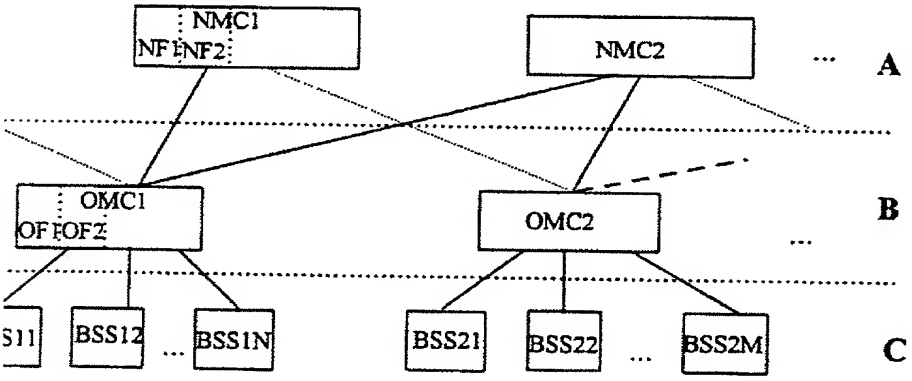
NMC1
NF1
NF2
NMC2
A
OMC1
OMC2
B
BSS12
BSS1N
BSS21
BSS22
BSS2M
C

Fig. 2

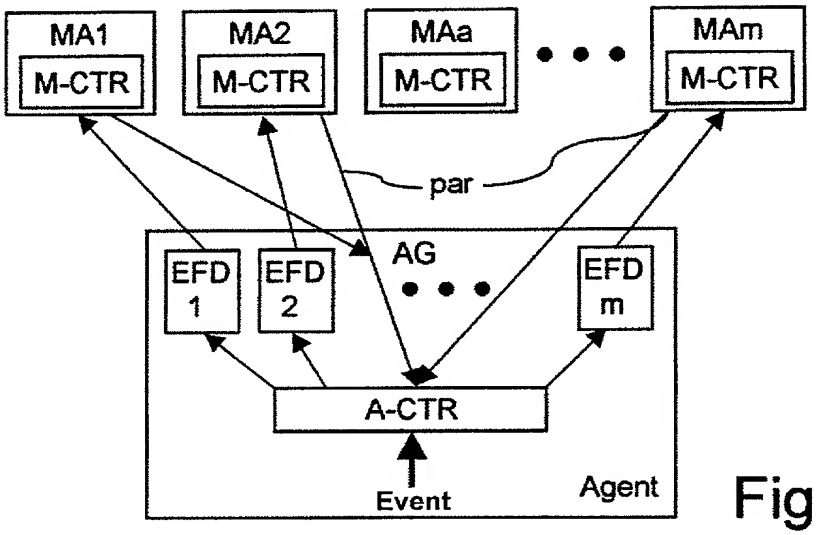
MA1
M-CTR
MA2
M-CTR
MAa
M-CTR
MAm
M-CTR
par
AG
EFD 1
EFD 2
EFD m
A-CTR
Event
Agent

Fig. 3

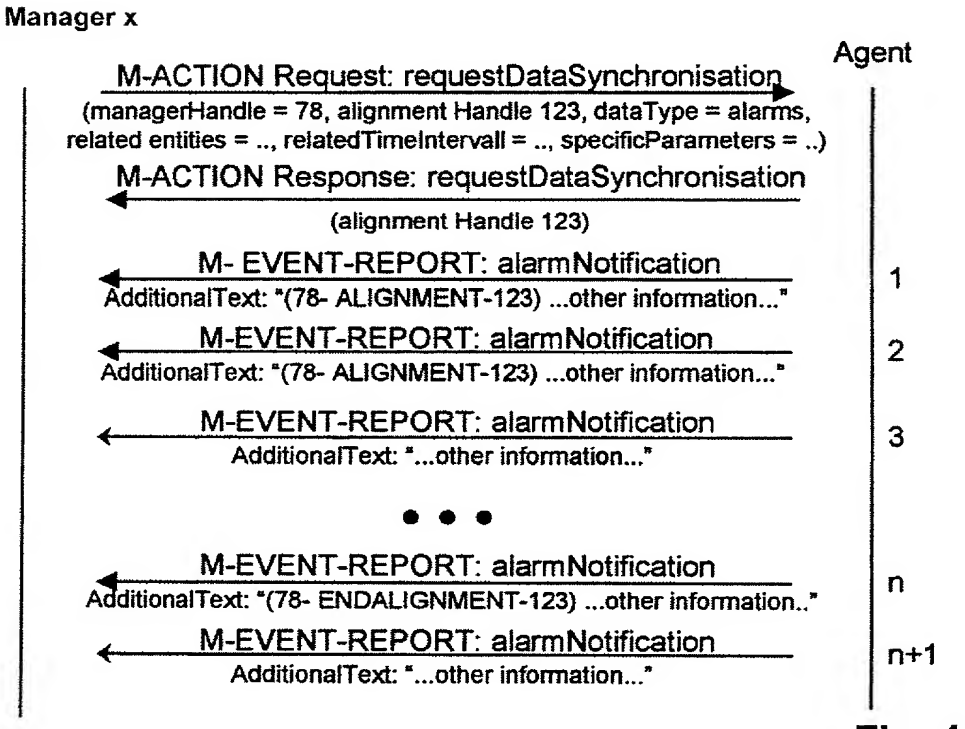
Manager x
Agent
M-ACTION Request: requestDataSynchronisation
(managerHandle = 78, alignment Handle 123, dataType = alarms, related entities = .., relatedTimeIntervall = .., specificParameters = ..)
M-ACTION Response: requestDataSynchronisation
(alignment Handle 123)
M- EVENT-REPORT: alarmNotification
AdditionalText: "(78- ALIGNMENT-123) ...other information..."
1
M-EVENT-REPORT: alarmNotification
AdditionalText: "(78- ALIGNMENT-123) ...other information..."
2
M-EVENT-REPORT: alarmNotification
AdditionalText: "...other information..."
3
M-EVENT-REPORT: alarmNotification
AdditionalText: "(78- ENDALIGNMENT-123) ...other information.."
n
M-EVENT-REPORT: alarmNotification
AdditionalText: "...other information..."
n+1

Fig. 4

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Generisches Alignment-Verfahren in einer Multi-Manager-Umgebung

Generic alignment method in a multi-manager environment

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am 18.08.2000 als
PCT internationale Anmeldung
PCT Anmeldungsnummer PCT/DE00/02827
eingereicht wurde und am _____
abgeändert wurde (falls tatsächlich abgeändert).

(check one)
☐ is attached hereto.
☒ was filed on 18.08.2000 as
PCT international application
PCT Application No. PCT/DE00/02827
and was amended on _____
(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
19940048.2	DE	24.08.1999	☒	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
			☐	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
			☐	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

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(Application Serial No.) (Anmeldeseriennummer)	(Filing Date D, M, Y) (Anmeldedatum T, M, J)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
PCT/DE00/02827	18.08.2000	anhängig	pending
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date D,M,Y) (Anmeldedatum T, M; J)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

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